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(54) **FLOOD SHIELD SYSTEMS AND METHODS**

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(51) **Int. Cl.**

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E06B 1/56	(2006.01)
E06B 9/00	(2006.01)
E06B 9/58	(2006.01)

(52) **U.S. Cl.**

CPC ... ***E06B 9/13*** (2013.01); ***E06B 1/56*** (2013.01); *E06B 2009/007* (2013.01); *E06B 2009/588* (2013.01)

(58) **Field of Classification Search**

CPC E04B 1/92; E06B 1/56; E06B 9/13; E06B 2009/007; E06B 2009/588
USPC 52/202
See application file for complete search history.

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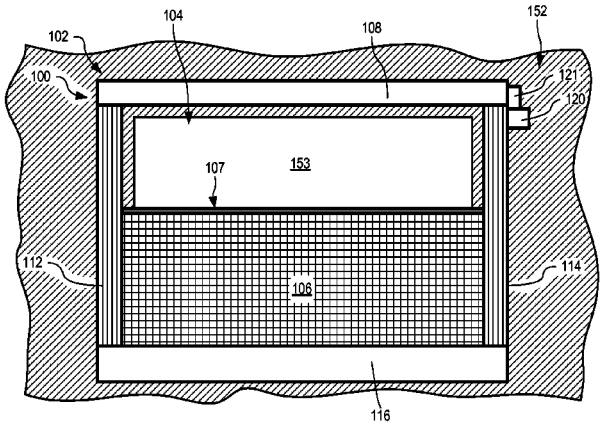
(57) **ABSTRACT**

A deployable flood shield, and associated method, prevents ingress of water through an opening. An outer frame is positioned to surround the opening and has a top channel, a bottom channel, a left channel and a right channel. A flexible shield is stored within the bottom channel prior to deployment and has a left edge retained by the left channel and a right edge retained by the right channel. Seals are configured with each of the bottom, left, and right channels for sealing between the bottom, left, and right channels and the flexible shield when deployed. A controller deploys the flexible shield to prevent the ingress of water into the opening. A deploy command is received and a motor is driven, for a predefined period, to deploy a flexible shield to block the opening and preventing the flexible shield from retracting.

19 Claims, 11 Drawing Sheets



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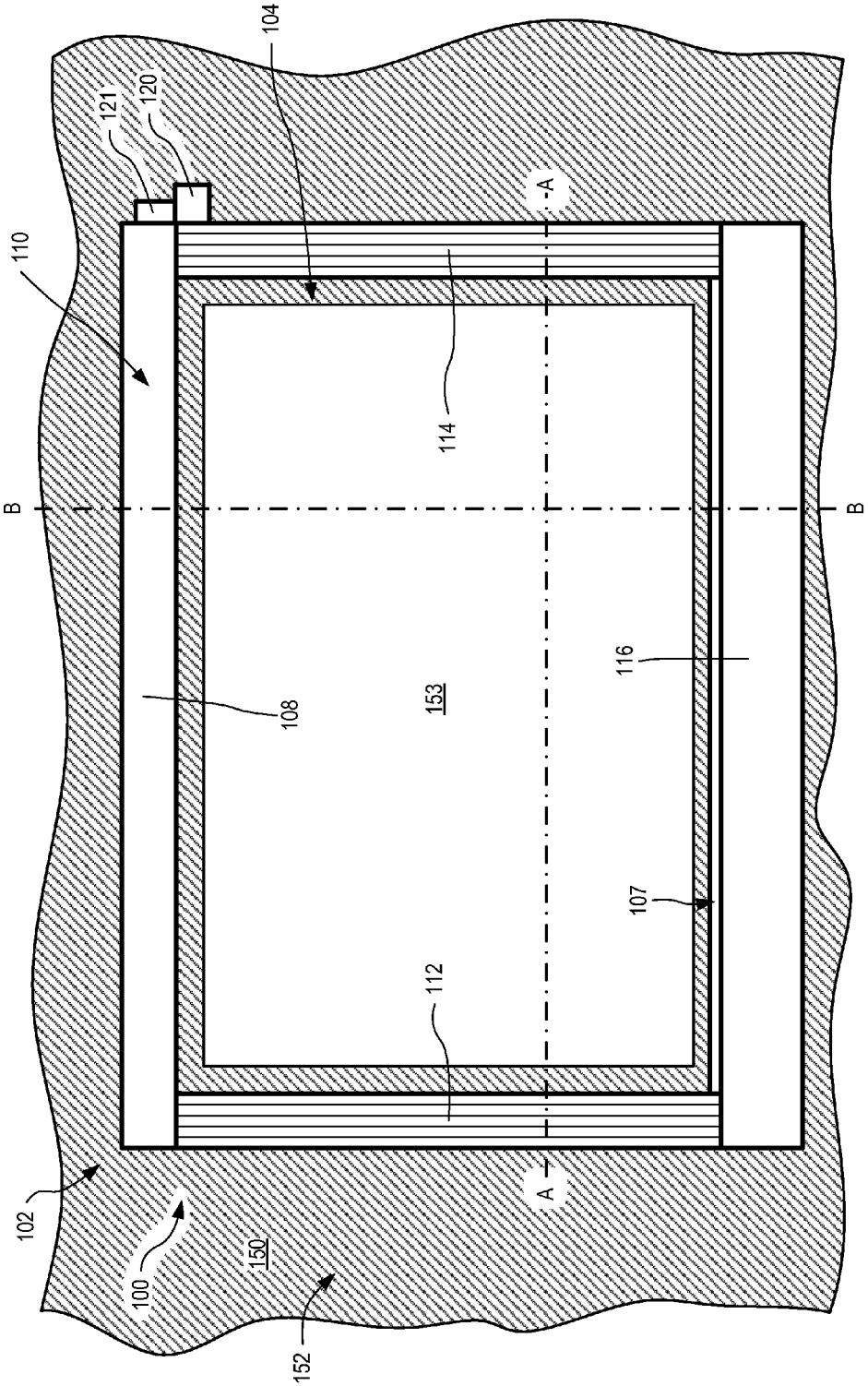

FIG. 1

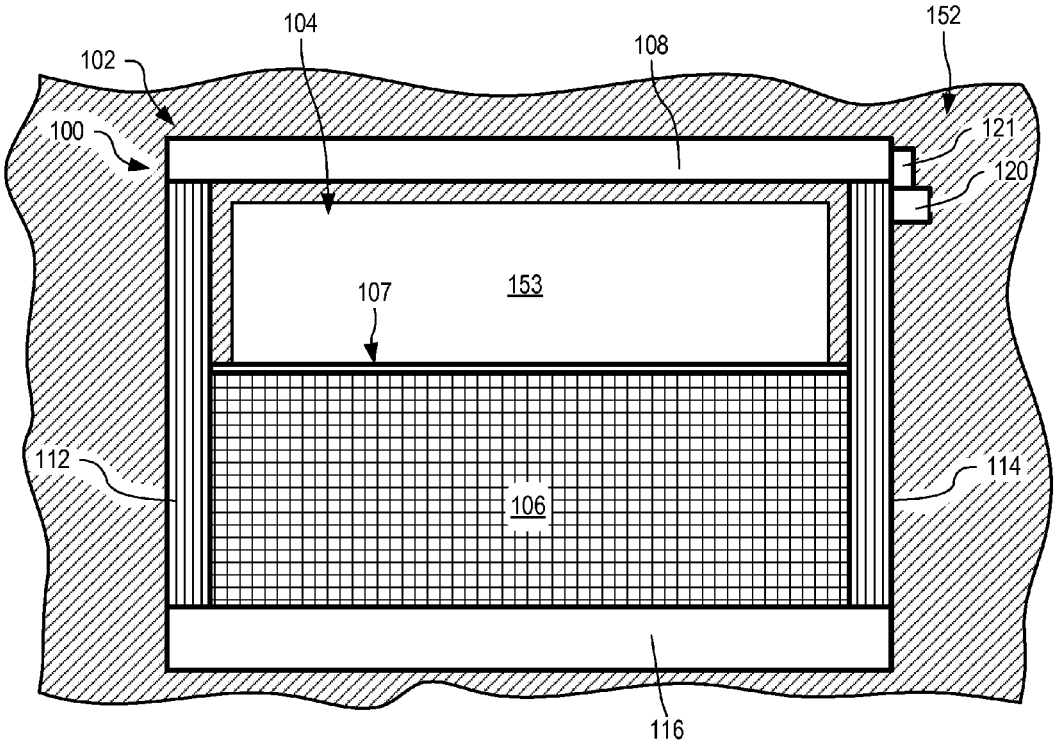
104
102
108
152
100
121
120
153
107
112
114
106
116

FIG. 2

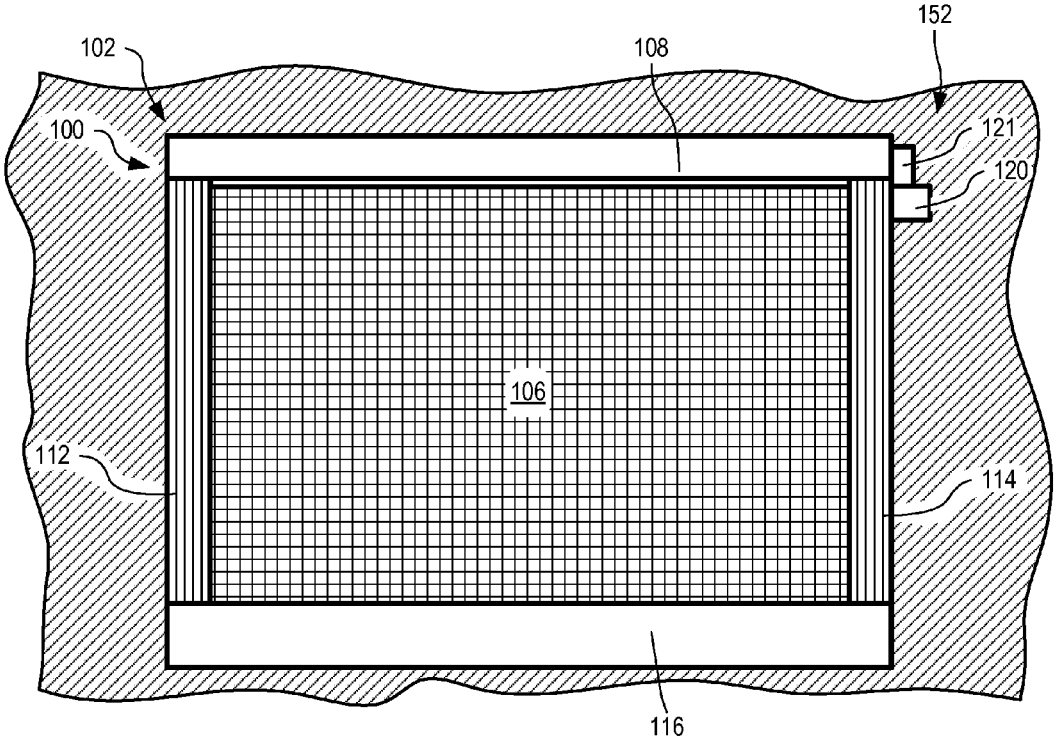
152
102
108
100
121
120
106
112
114
116

FIG. 3

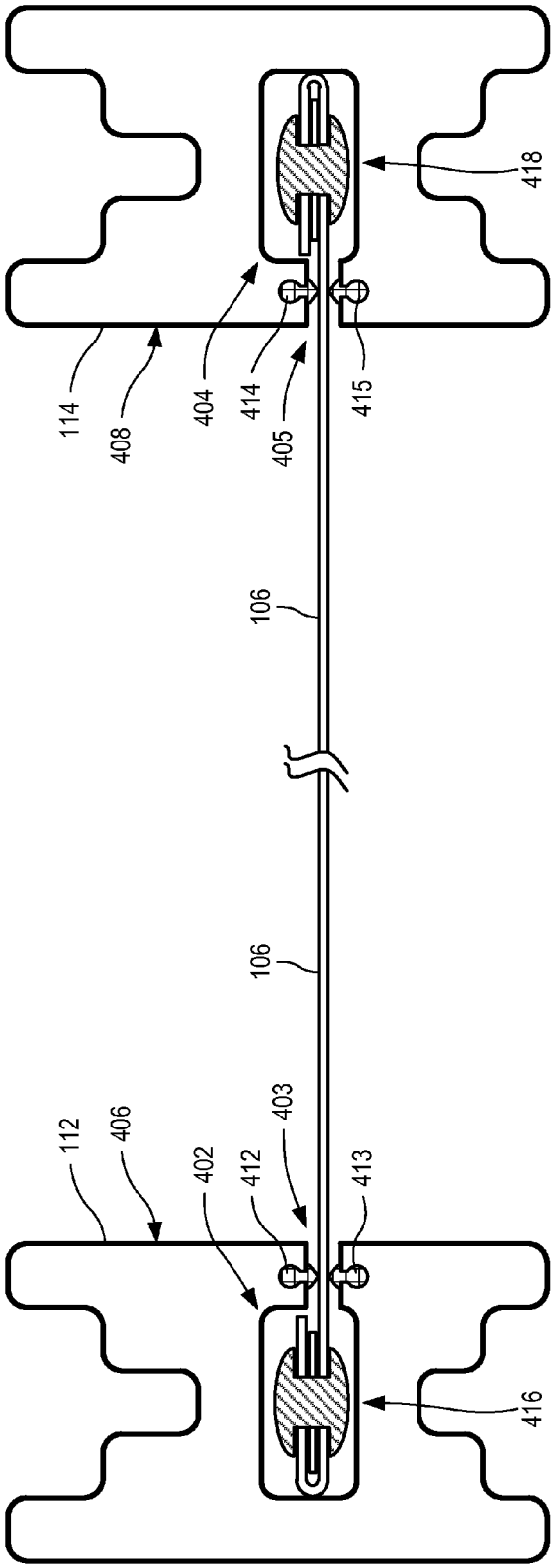
CROSS-SECTION A-A OF FIG. 1
418
114
408
404
414
405
415
106
106
112
406
402
412
403
413
416

FIG. 4

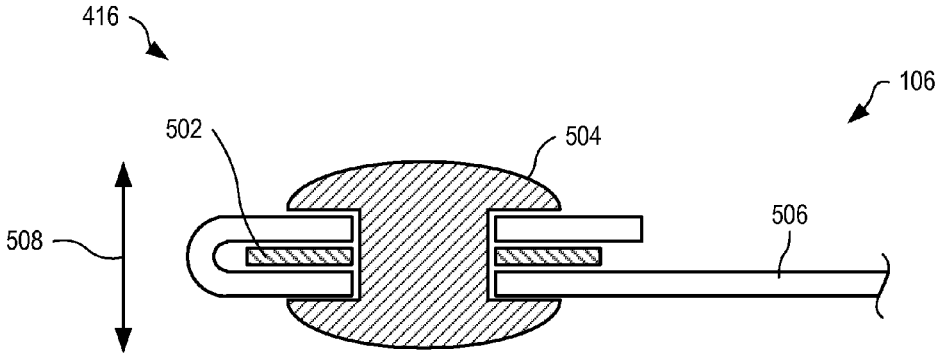

FIG. 5

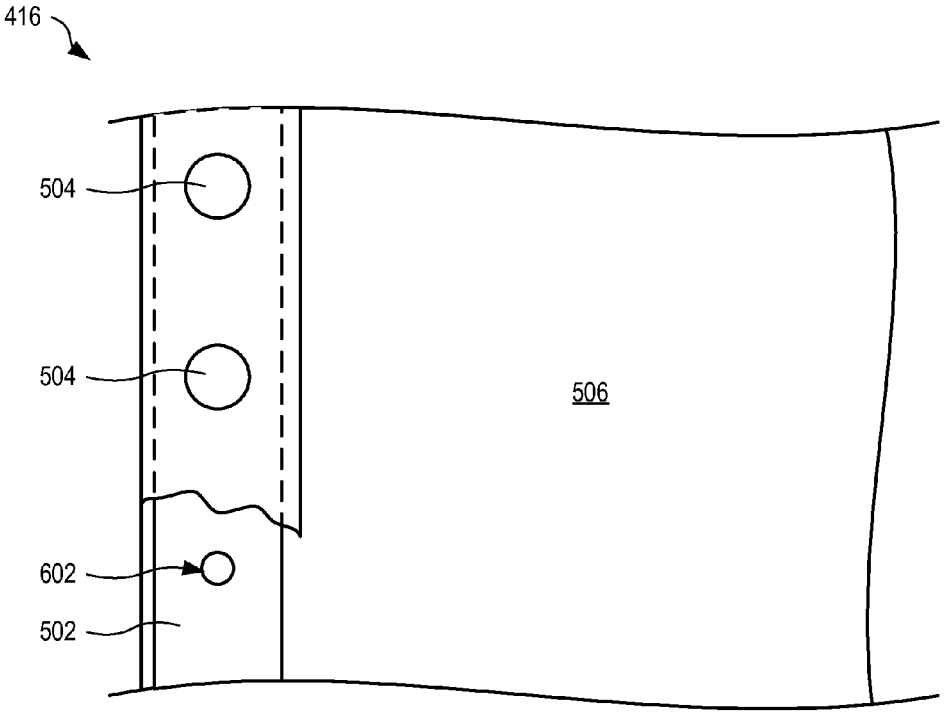

FIG. 6

CROSS-SECTION B-B OF FIG. 1

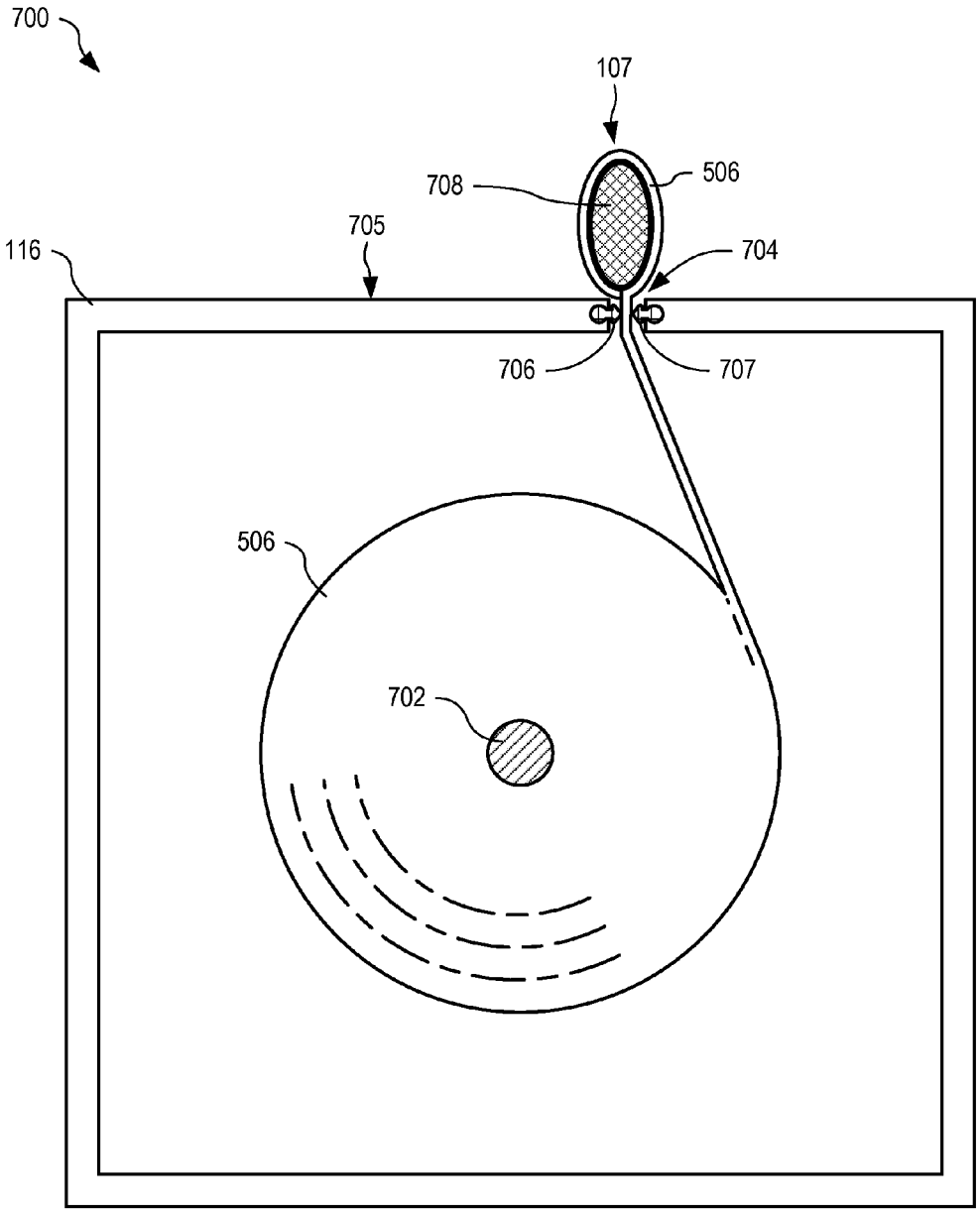

FIG. 7

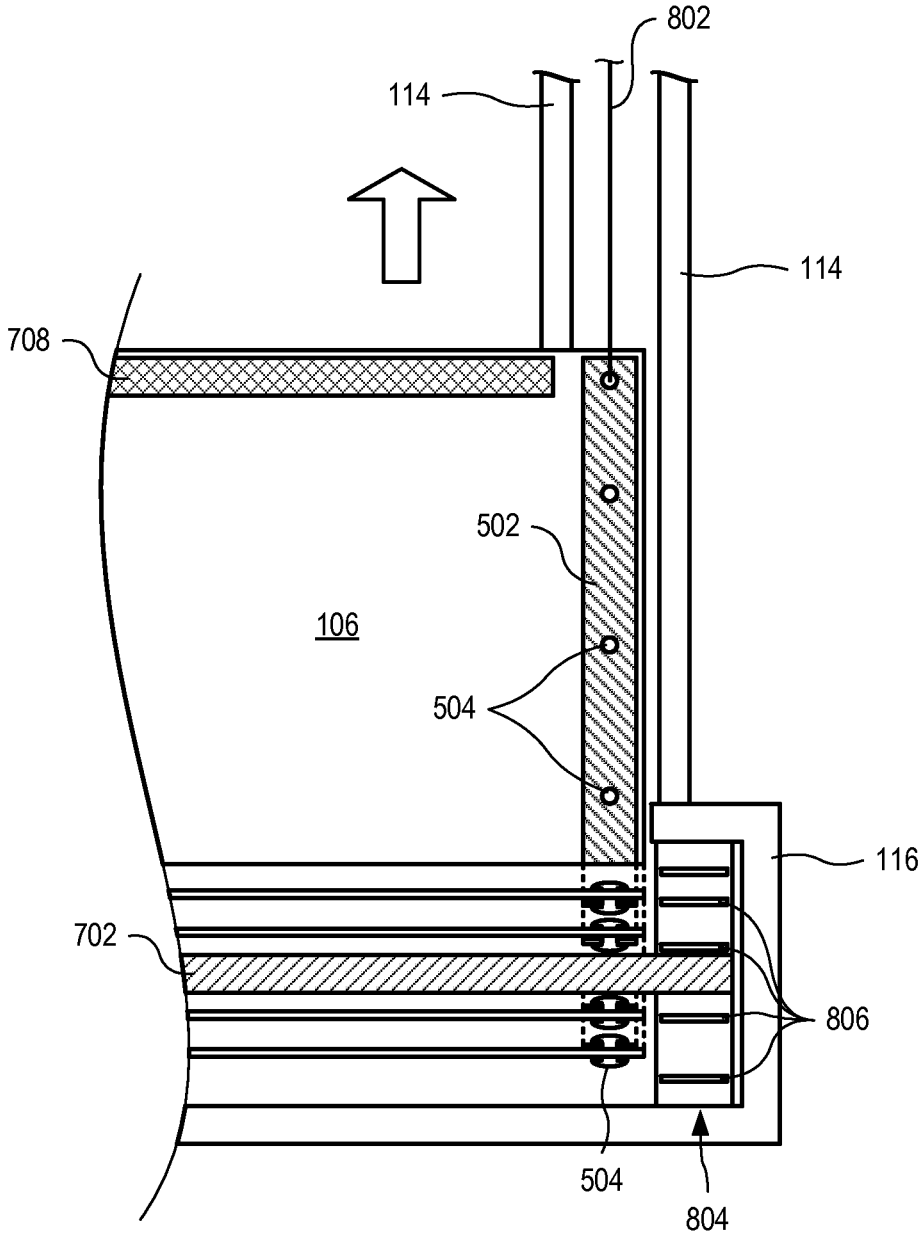

FIG. 8

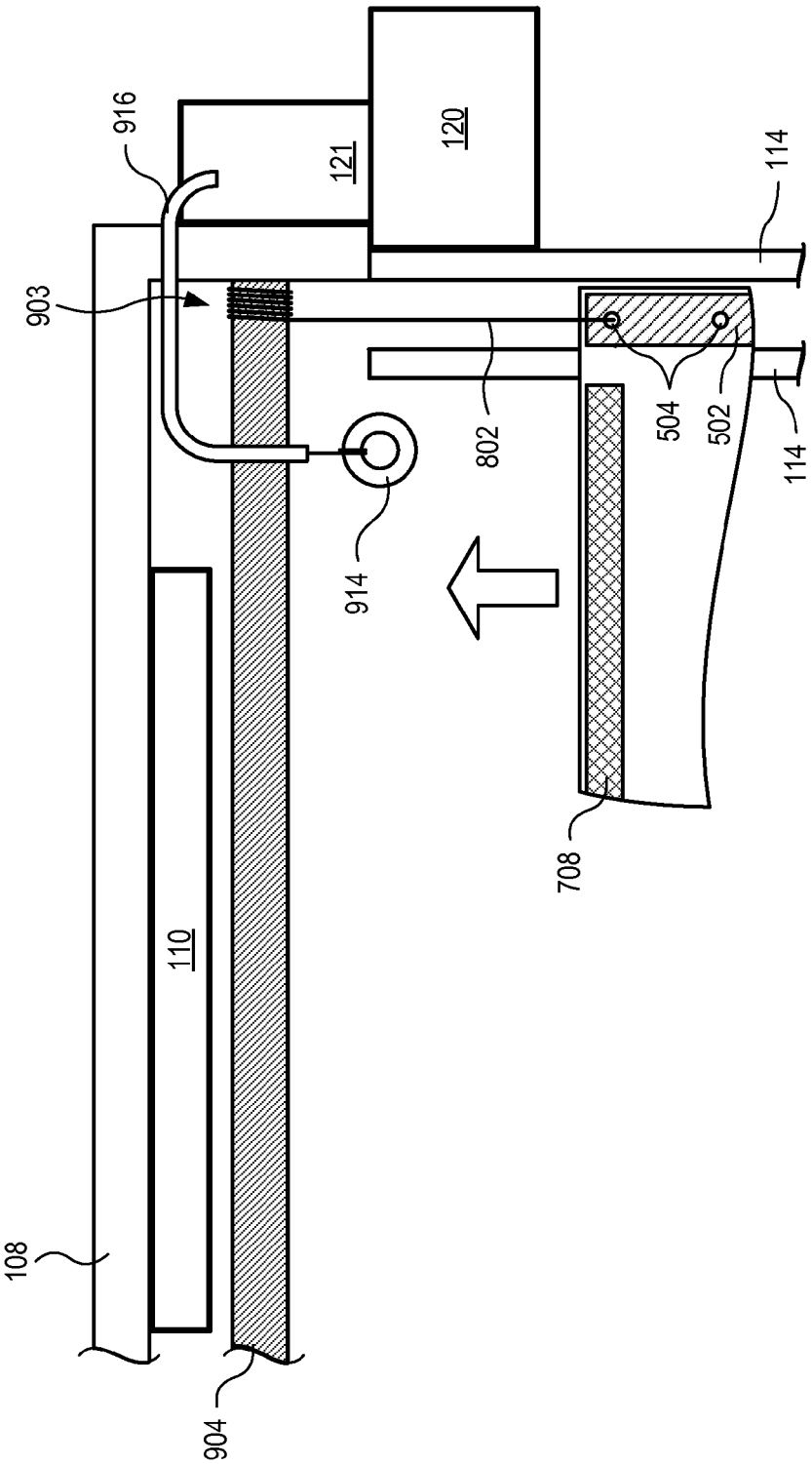

FIG. 9

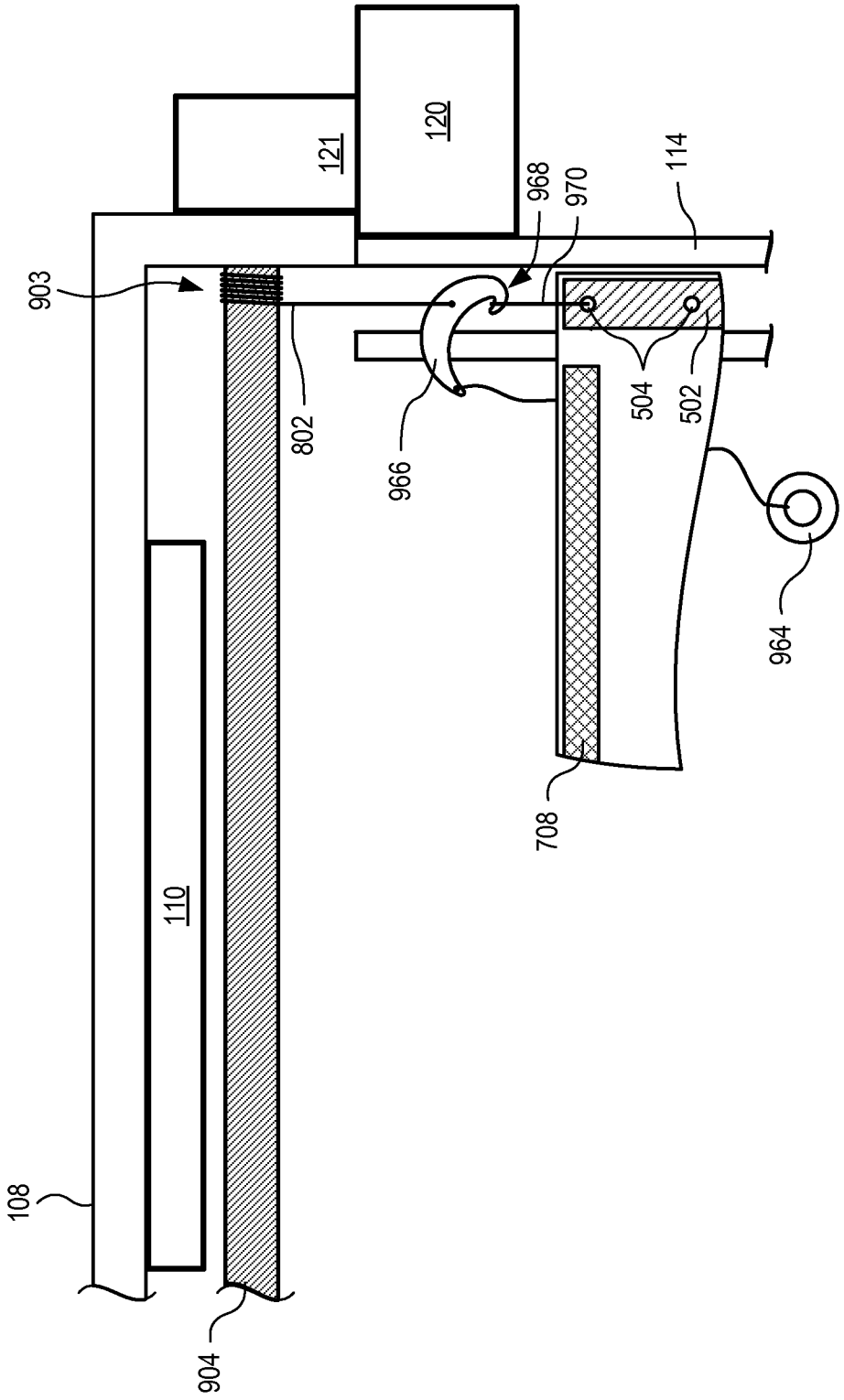

FIG. 9A

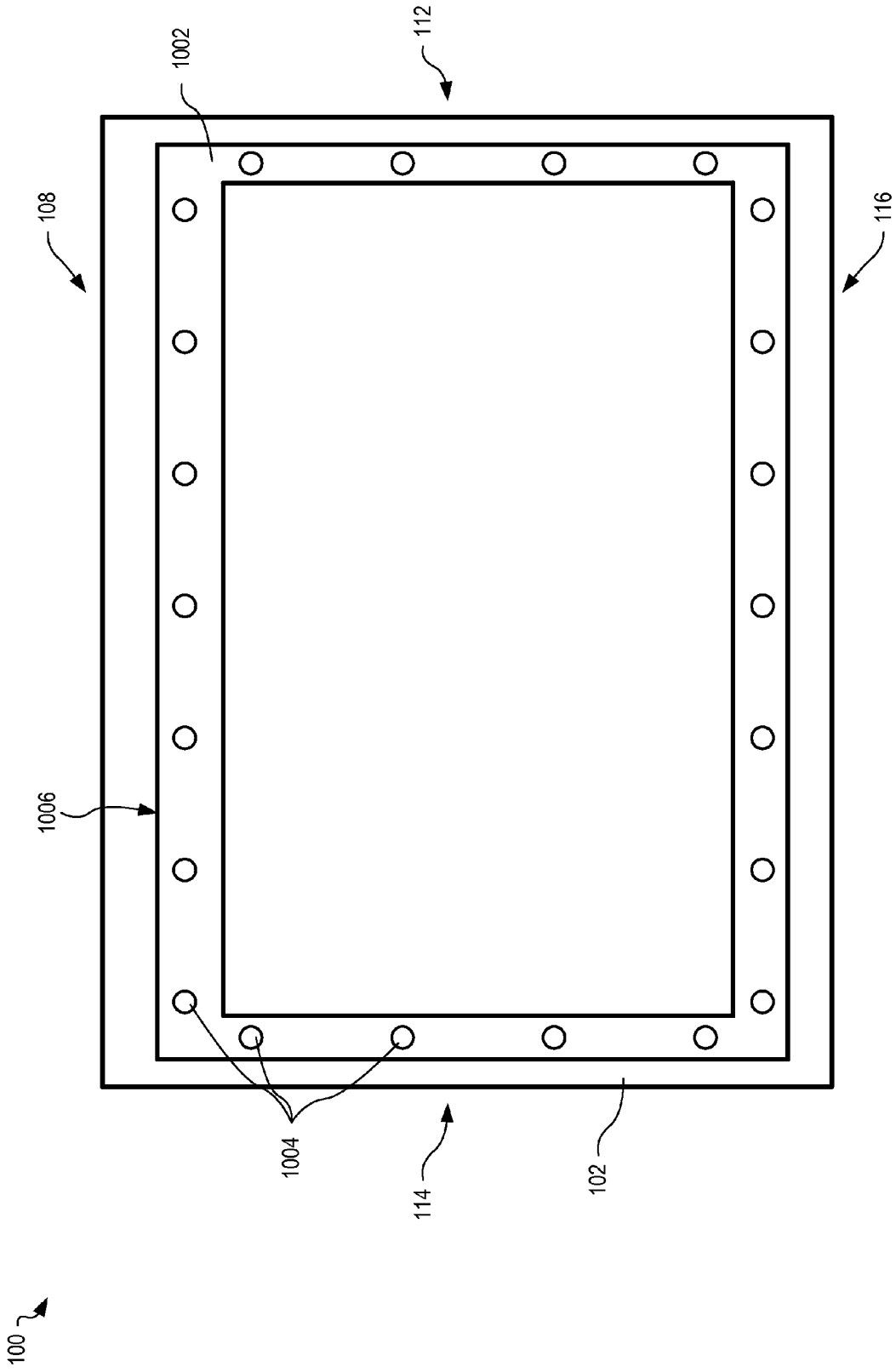

FIG. 10

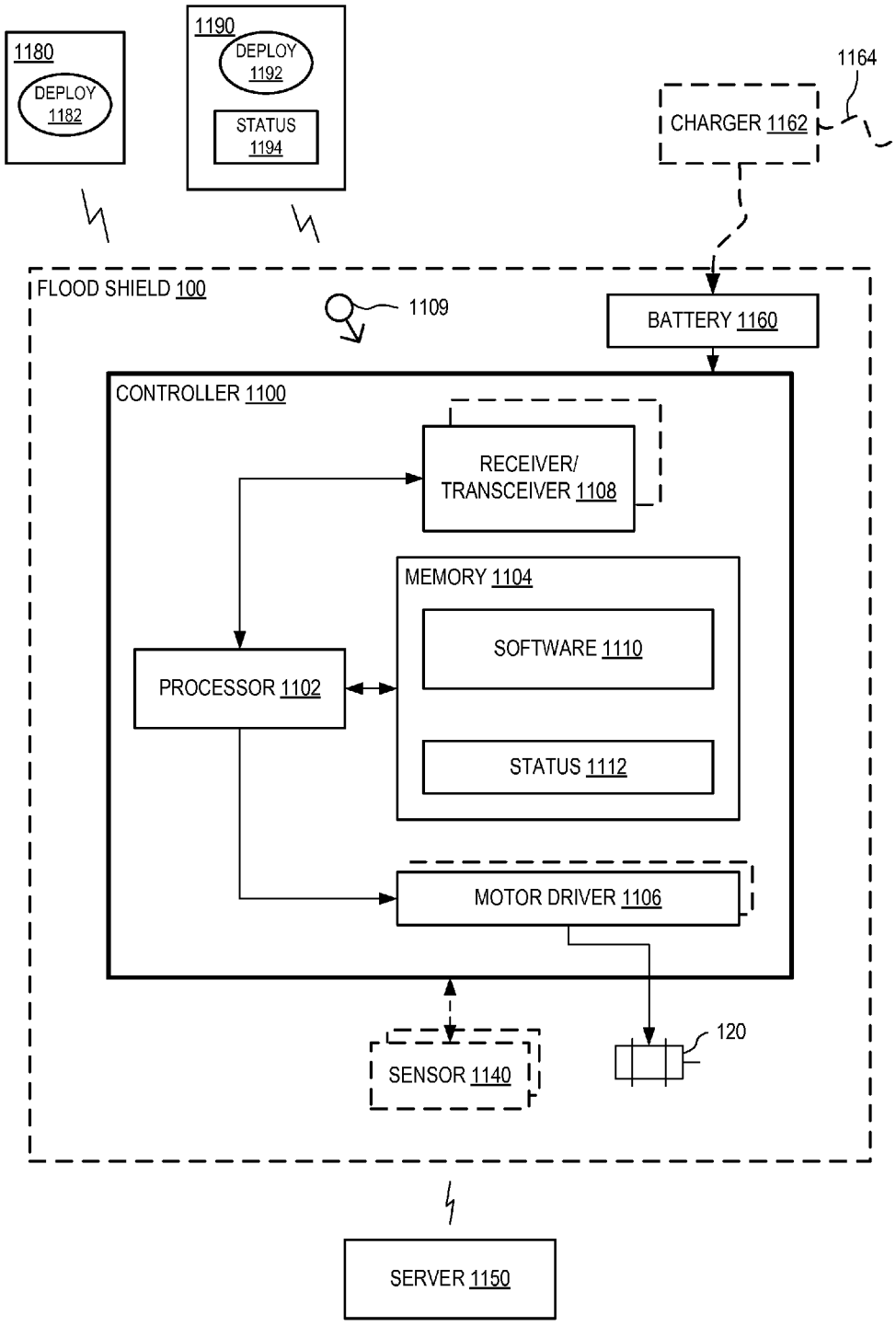
1180
DEPLOY 1182
1190
DEPLOY 1192
STATUS 1194
1164
CHARGER 1162
FLOOD SHIELD 100
1109
BATTERY 1160
CONTROLLER 1100
RECEIVER/ TRANSCEIVER 1108
MEMORY 1104
SOFTWARE 1110
PROCESSOR 1102
STATUS 1112
MOTOR DRIVER 1106
120
SENSOR 1140
SERVER 1150

FIG. 11

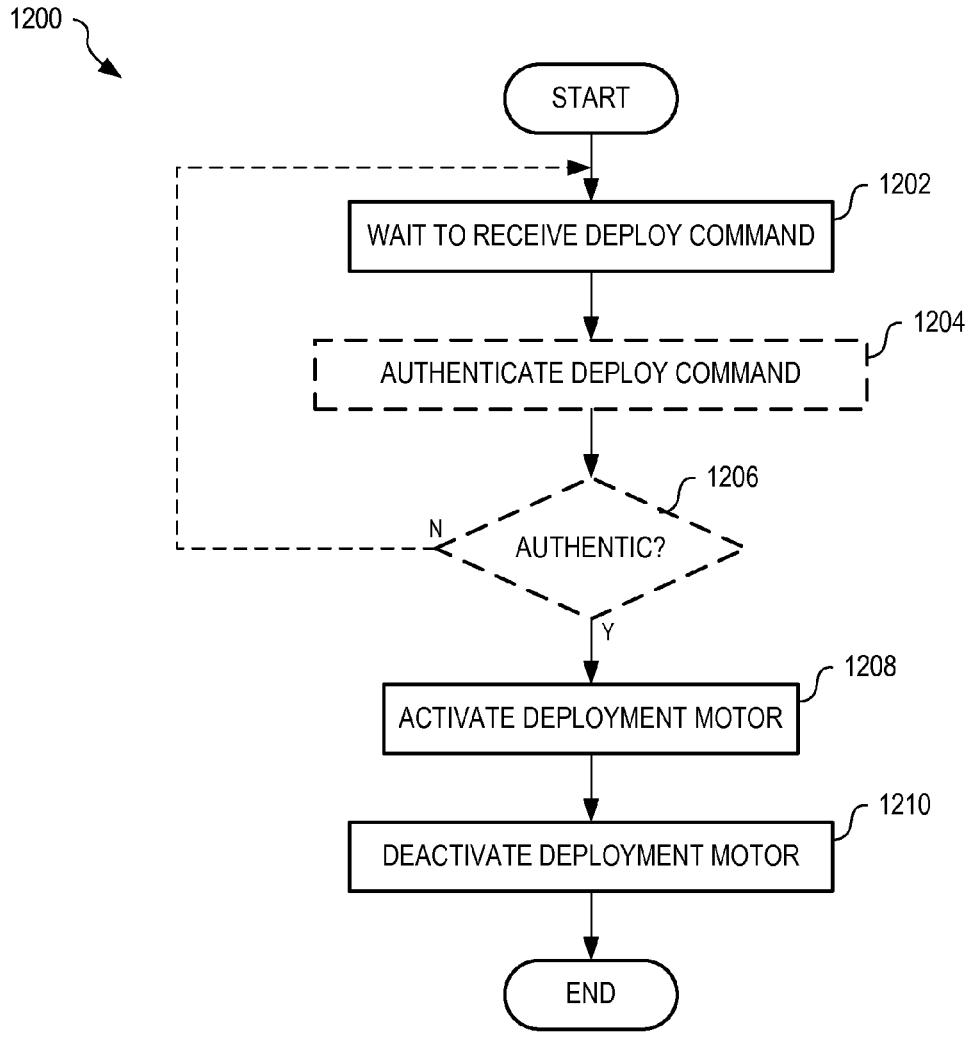
1200
START
1202
WAIT TO RECEIVE DEPLOY COMMAND
1204
AUTHENTICATE DEPLOY COMMAND
1206
AUTHENTIC?
N
Y
1208
ACTIVATE DEPLOYMENT MOTOR
1210
DEACTIVATE DEPLOYMENT MOTOR
END

FIG. 12

FLOOD SHIELD SYSTEMS AND METHODS

RELATED APPLICATIONS

This application claims priority to U.S. Patent Application Ser. No. 61/894,807, titled "Flood Shield Systems and Methods", filed Oct. 23, 2013, and is incorporated herein by reference.

BACKGROUND

Basements of properties located in a potential area of flooding are particularly vulnerable to flooding through basement windows. Although prevention is sometimes possible if the property owner/manager can divert the flow of water (e.g., using sand bags), often the owner/manager is unable to mitigate the damage, especially in the event of a flash flood.

During a flood, major damage is caused by water and debris getting into a building. This can be caused by the breaking of basement windows due to the force of the floodwater, or the force of an object being carried by water hitting the window. Once the window breaks, water and mud are free to flow into the basement, causing massive damage. Many people do not have or cannot afford flood insurance to cover damage.

In most cases, any kind of shutter is normally manually deployed or installed at the time it is needed. But flash flood warnings do not leave enough time for manual intervention. Indeed, the homeowners may not even be home to perform the task.

SUMMARY OF THE INVENTION

Our solution to this common problem is a deployable waterproof shield that protects a building from flooding during a flood. The flood shield consists of a casing (sometimes referred to as a box or frame hereinafter) that is attached to an exterior wall surrounding an opening (e.g., a window or a door) in the building. The flood shield may be attached to the building after its construction, or may be configured with the building during construction. The shield is in one of two states: deployed or non-deployed. The shield starts in the non-deployed state. In the non-deployed state, the window is unobstructed so that it can be opened fully, allowing both air and light to pass freely and to allow egress. Since the box is outside of the window casing, the view out the window is entirely unobstructed.

In the event of a flood, the shield is deployed. There are a number of ways the shield can be activated, which are discussed later. The activation of the shield causes a waterproof, impenetrable material to cover the entire opening of the casing and prevents any water from getting through or past the shield. The material itself, described later in more detail, is flexible so that it can be stored in a rolled up state when not deployed, but is impenetrable to both water and hard objects that might come in contact with it. Once deployed, the window is protected from both floodwaters and from debris being carried by the water. When the event is over, the shield can be re-stowed so that it can be ready for use at a future time.

In one embodiment, a deployable flood shield prevents ingress of water through an opening. An outer frame is positioned to surround the opening and has a top channel, a bottom channel, a left channel and a right channel. A flexible shield is stored within the bottom channel prior to deployment and has a left edge retained by the left channel and a right edge retained by the right channel. Seals are configured with each of the bottom, left, and right channels for sealing between the bottom, left, and right channels and the flexible shield when deployed. A controller deploys the flexible shield to prevent the ingress of water into the opening.

In another embodiment, a method prevents ingress of water through an opening, and includes the steps of receiving a deploy command, driving, for a predefined period, a motor to deploy a flexible shield to block the opening, and preventing the flexible shield from retracting. The deployed flexible shield is held in position by a frame around the opening.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** is a front view of one exemplary flood shield positioned on an exterior surface of a building prior to deployment, in an embodiment.

FIG. **2** shows the flood shield of FIG. **1** with the flexible shield partially deployed.

FIG. **3** shows the flood shield of FIG. **1** with the flexible shield fully deployed.

FIG. **4** shows a cross section A-A through the flood shield of FIG. **1**.

FIG. **5** shows a left edge of the flexible shield of FIG. **4** in further exemplary detail.

FIG. **6** shows a rear cut-away view of the left edge of the flexible shield of FIG. **4**.

FIG. **7** shows a cross sectional view through the bottom channel, at line B-B, of the flood shield of FIG. **1** when not deployed.

FIG. **8** shows a cut-away view of a right-hand end of the bottom channel of the flood shield of FIG. **1** illustrating an automatic retracting mechanism.

FIG. **9** shows a cut-away view of a right-hand end of the top channel of the flood shield of FIG. **1** illustrating a pull cable for deploying the flood shield.

FIG. **9**A shows a cut-away view of a right-hand end of the top channel of the flood shield illustrating an alternative mechanism for allowing a user to retract the flexible shield, in an embodiment.

FIG. **10** is a rear view of the flood shield of FIG. **1**, illustrating exemplary mounting holes formed within a mounting bracket for attaching the flood shield to a building, in an embodiment.

FIG. **11** shows one exemplary controller for deploying the flood shield of FIG. **1**, in an embodiment.

FIG. **12** is a flowchart illustrating one exemplary method for deploying the flood shield of FIG. **1** to protect the opening from ingress of water, in an embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

FIG. **1** is a front view of one exemplary flood shield **100** positioned on an exterior surface **152** of a building **150** prior to deployment. Flood shield **100** is deployed to prevent flooding through an opening **153** (e.g., one or more of a window, a doorway, and other such openings within a wall or structure) of the building. Flood shield **100** has a top channel **108**, a left channel **112**, a right channel **114**, and a bottom channel **116** that cooperate to form an exterior frame (casing/box) **102** that is positioned on exterior surface **152** to surround opening **153**. For example, flood shield **100** may be positioned within a window well of the building such that frame **102** surrounds a basement window. Flood shield **100** may be added to an existing building or may be configured with the building during construction of the building.

FIG. **2** shows flood shield **100** of FIG. **1** with a flexible shield **106** partially deployed. FIG. **3** shows flood shield **100**

of FIG. **1** with flexible shield **106** fully deployed. FIGS. **1-3** are best viewed together with the following description.

As shown in FIG. **3**, frame **102** has an opening **104** that is filled by a flexible shield **106** when flood shield **100** is deployed. When flood shield **100** is not deployed, as shown in FIG. **1**, flexible shield **106** is rolled up and stored within bottom channel **116** of frame **102** such that opening **104** is not filled, thereby allowing the surrounded opening **153** (e.g., window) to be used as normal. Flexible shield **106** is constructed as a flexible material that is waterproof, has a high tensile strength, and is resistant to penetration and tearing. In one embodiment, shield **106** is formed from a first strong but non-water resistant material that is laminated with a second water-proof material. For example, flexible shield **106** may be formed of a heavy-duty canvas (e.g., a rhino canvas or similar material) that is laminated with a second flexible waterproofing material such as vinyl. In another embodiment, where additional strength is desired, shield **106** is formed from a laminated Kevlar material.

Shield **106** is flexible and easily rolled-up for compact storage within bottom channel **116**. Shield **106** is also significantly cheaper to manufacture, as compared to standard metal shutters that may be used to secure windows and doors during inclement weather.

Top channel **108** may include a compartment **110** for storing control electronics (see controller **1100** of FIG. **11**) and a battery that provides power to deploy flood shield **100**. Although illustrated as being stored within bottom channel **116**, it will be appreciated that shield **106** may be stored within top channel **108** and pulled down for deployment without departing from the scope hereof. Similarly, the battery may be located anywhere within frame **102** or positioned external to frame **102** without departing from the scope hereof.

Flood shield **100** also includes a motor **120** and drive gear **121** for deploying flood shield **100**. Although shown external to frame **102**, motor **120** and drive gear **121** may be positioned within frame **102** without departing from the scope hereof. For example, motor **120** and drive gear **121** may be configured within top channel **108**. Drive gear **121** is configured such that shield cannot retract once deployed. For example, drive gear **121** may include a ratchet mechanism that prevents flexible shield **106** from retracting once deployed.

FIG. **4** shows a cross section A-A through flood shield **100** of FIG. **1**. Left channel **112** contains a left passage **402** and left slot **403** that both run vertically through left channel **112**. Slot **403** forms an opening to left passage **402** on an inside edge **406** of left channel **112**. Similarly, right channel **114** contains a right passage **404** and a right slot **405** that both run vertically through right channel **114**. Slot **405** forms an opening to right passage **404** on an inside edge **408** of right channel **114**.

A left edge **416** of flexible shield **106** is positioned within, and retained by, left passage **402** such that flexible shield **106** passes through left slot **403**. Left slot **403** has seals **412**, **413** positioned on either side of slot **403** and running the entire length of slot **403**. A right edge **418** of flexible shield **106** is positioned within, and retained by, right passage **404** such that flexible shield **106** passes through right slot **405**. Right slot **405** has seals **414**, **415** positioned on either side of slot **405** and running the entire length of slot **405**. Seals **412**, **413** and seals **414**, **415** form a substantially watertight seal with shield **106** when deployed and allow shield **106** to pass therebetween during deployment.

FIG. **5** shows left edge **416** of flexible shield **106** in further exemplary detail. FIG. **6** shows a rear cut-away view of left edge **416**. FIGS. **5** and **6** are best viewed together with the following description. Right edge **408** is a lateral reversal of left edge **416**. The edge of material **506** of flexible shield **106** is wrapped around a thin spring strip **502** (e.g., a spring steel or plastic material) and are secured together by a plurality of rivets **504**. Spring strip **502** may have pre-formed holes **602** to facilitate application of rivets **504**. Other methods of coupling material **506** to spring strip **502** may be used without departing from the scope hereof.

As shown in FIG. **4**, rivets **504** and spring strip **502** increase the thickness **508** of edge **416**, and similarly edge **418**, to be greater than the width of slots **403**, **405**, such that edges **416**, **418** are retained within passages **402**, **404**, respectively.

FIG. **7** shows a cross sectional view **700** through bottom channel **116** at line B-B of flood shield **100** of FIG. **1** when not deployed. Material **506** of shield **106**, including left and right edges **406**, **408**, is wound around a roller **702** positioned lengthwise within bottom channel **116** of frame **102**. Bottom channel **116** has a top slot **704** formed on a top side **705** of bottom channel **116**. Slot **704** has first and second seals **706**, **707**, respectively, that allow material **506** to pass through during deployment while forming a substantially watertight seal with flexible shield **106** when deployed. Material **506** is permanently attached to roller **702** and is thereby retained within bottom channel **116** when shield **106** is deployed. Roller **702** is for example constructed of metal or other bend resistant material. Seals **412**, **413**, **414**, **415**, **706**, and **707** are formed of a pliable material (e.g., rubber, soft plastic).

A top edge **107** of flexible shield **106** is strengthened by a bar **708** that extends between left channel **112** and right channel **114**. Material **506** is permanently attached to bar **708**. In one embodiment, material **506** is wrapped around bar **708** and stitched such that bar **708** is retained within top edge **107** of shield **106**. In an alternate embodiment, bar **708** is an inverted "U" shape and compressed onto a top edge of material **506** to form top edge **107**.

FIG. **8** shows a cut-away view of a right-hand end of bottom channel **116** of flood shield **100** of FIG. **1**, illustrating an automatic retracting mechanism **804**. FIG. **9** shows a cut-away view of a right-hand end of top channel **108** illustrating a pull cable **802** (e.g., made of a high tensile material such as steel) attached to a right hand top corner of flexible shield **106** and attached to a rod **904** at a winding area **903**. FIGS. **8** and **9** are best viewed together with the following description.

Rod **904** is rotated, during deployment of flood shield **100**, by a motor **120** via drive gear **121**. As rod **904** rotates, cable **802** is wound around rod **904** at winding area **903**. A similar cable and wind up area are positioned in the upper left portion of flood shield **100**. Thus, as rod **904** is rotated by motor **120**, shield **106** is pulled off of, and up from, roller **702** within bottom channel **116**. As shield is pulled up, left and right edges **416**, **418** of shield **106** slide upwards within passages **402**, **404**, respectively, until top edge **107** of shield **106** reaches top channel **108**.

Bottom channel **116** includes a retracting mechanism **804** that has a spring **806** coupled with roller **702** and bottom channel **116**. As shield **106** is deployed and roller **702** rotates, spring **806** is wound up. Retracting mechanism **804** thereby applies a tension to shield **106** during deployment. A pull **914** is provided to allow a user to retract flexible shield **106**, as may be required for emergency egress through opening **153**. In one embodiment, pull **914** is coupled via a channel **916** to drive gear **121** and operates to disengage the ratchet mechanism such that retracting mechanism **804** automatically retracts flexible shield **106**. Pull **914** is for example positioned on an inside surface of flood shield **100** that is accessible from opening **153** when flood shield **100** is deployed. In one embodiment, pull **914** is positioned on an inner reachable

surface (e.g., a lower end of right channel **114**, or an inward facing surface of bottom channel **116**) of flood shield **100**. Releasing pull **914** causes ratchet mechanism within drive gear **121** to reengage, allowing for normal operation of flood shield **100**.

FIG. **9**A shows a cut-away view of a right-hand end of top channel **108** illustrating an alternative embodiment for allowing a user to retract flexible shield **106**. FIG. **9**A is similar to FIG. **9**, but pull **914** is replaced by a pull **964** and a decoupling mechanism **966** that, when activated by pull **964**, decouples cable **802** from flexible shield **106**. For example, as pull **964** is pulled down, decoupling mechanism **966** pivots and hook **968** disengages from a connecting loop **970**. Connecting loop **970** is attached to a top corner of flexible shield **106** as shown. A similar mechanism is provided for left channel **112**. When both left and right pulls **964** are pulled downward, flexible shield **106** is released from cables **802** and retracting mechanism **804** automatically retracts flexible shield **106**.

FIG. **10** is a rear view of flood shield **100** of FIG. **1**, illustrating exemplary mounting holes **1004** formed within a mounting bracket **1002** for attaching flood shield **100** to a building. A rubber seal **1006** prevents water ingress between mounting bracket **1002** and frame **102** when flood shield **100** is mounted to a wall of the building. A sealing compound and/or rubber stripping may be applied between mounting bracket **1002** and the wall of the building to ensure water is kept out. A watertight seal is thus created when frame **102** is tightly mounted to exterior surface **152**.

FIG. **11** shows one exemplary controller **1100** for deploying flood shield **100** of FIG. **1**. Controller **1100** includes a processor **1102**, a memory **1104**, at least one motor driver **1106**, and at least one receiver/transceiver **1108**. A battery **1160** powers controller **1100** and thereby other components of flood shield **100**, such as motor **120**. Receiver/transceiver **1108** may represent one or more of a wireless network transceiver, a cellular transceiver, and a radio-frequency receiver. Receiver/transceiver **1108** may communicate with a wireless local area network (e.g., Wi-Fi) and/or a cellular network as used by mobile phones, to receive instructions from one or more radio transmitters, such as a remote control device **1180**. Battery **1160** may be continually trickle charged by a charger **1162** that connects to an electrical power source **1164** (e.g., 110V AC power). Charger **1162** may additionally include solar components such that battery **1160** is also, or alternatively, charged by solar energy. Battery **1160** enables operation of flood shield **100** when for example inclement weather renders power via a local power grid unavailable. In another embodiment, battery **1160** and charger **1162** are not included and controller **1100** is powered directly via electrical power source **1164**. In another embodiment, battery **1160** is not rechargeable (i.e., a single use battery).

Memory **1104** is shown storing software **1110** that has machine-readable instructions that when loaded and executed by processor **1102** perform functionality of controller **1100** as described herein. Memory is also shown storing a status **1112** that represents a current status of flood shield **100** determined by controller **1100**. For example, software **1110** may monitor voltage of battery **1160** and store an indicator (e.g., good/bad or the measured voltage, etc.) thereof within status **1112**. Optionally, flood shield **100** includes one or more sensors **1140** coupled with controller **1100**. For example, sensor **1140** may sense a deployment status of flood shield **100**, to indicate whether shield **106** is fully deployed. In another embodiment, one or more sensors **1140** are positioned within flood shield **100** to sense environmental conditions, such as pressure (internal and external to shield **106**), temperature (internal and external to shield **106**), and so on. Flood shield **100** may include and report information from other sensors without departing from the scope hereof.

In one embodiment, controller **1100** includes multiple receivers/transceivers **1108** such that any one of a wireless local area network (e.g., Wi-Fi), a cellular network as used by mobile phones, and a radio transmitter may be used to communicate with flood shield **100**. Flood shield **100** may thus be monitored and controlled by any of these communication means.

Controller **1100** may receive, within receiver/transceiver **1108**, a deploy command **1109** from one or more of remote control device **1180**, mobile device **1190**, remote server **1150** via Internet, and a radio transmitter (e.g., an emergency signal). In one example of operation, a user presses deploy button **1182** of remote **1180** to transmit a wireless signal indicating the required deployment to receiver/transceiver **1108**. In another example of operation, receiver/transceiver **1108** detects a broadcast emergency signal and initiates deployment automatically. In another example of operation, an owner of a property uses mobile device **1190** (e.g., a smart phone) to automatically send deploy command **1109** to flood shield **100**, via receiver/transceiver **1108** and a Wi-Fi network or a cellular network. In another example of operation, deploy command **1109** may originate from a remote service center and is received by receiver/transceiver **1108** of flood shield **100** via Wi-Fi and/or cellular networks. Optionally, software **1110** may authenticate deploy command **1109** to ensure the source of the command is a source authorized to deploy flood shield **100**. In one embodiment, deploy command **1109** includes at least one security feature that is identified and/or checked by software **1110** as an indication of authenticity of deploy command **1109** and its source.

Wireless Network Connectivity

For example, if a property is equipped with a wireless local area network, Wi-Fi, flood shield **100** may be configured to communicate via that network. Flood shield **100** may be added to the network in a similar manner to other devices (e.g., computers, TiVo, Nest, TVs, BluRay devices, etc.). Once connected to the network, flood shield **100** may also connect to the Internet, thereby allowing remote monitoring and control of flood shield **100**. With appropriate authorization, status **1112** of flood shield **100** may be remotely monitored and controlled from anywhere with Internet connectivity. For example, status and control of flood shield **100** may be available using a web browser and/or an app (running on a smart device).

Cellular Network Connectivity

Not all homes are equipped with a wireless local area network (Wi-Fi). Therefore, receiver/transceiver **1108** may be configured to communicate using a cellular network instead of, or as well as, Wi-Fi. For example, the cellular network may provide communication with the Internet in the absence of Wi-Fi.

In one embodiment, receiver/transceiver **1108** is configured to receive an emergency broadcast signal via a cellular network. During severe weather, upon receiving the emergency broadcast signal, controller **1100** may be configured to automatically deploy flood shield **100**. Thus, commands from an owner, or a service center, are not needed to protect the property.

Radio Frequency (RF) Receiver

Whether or not one or both of Wi-Fi and cellular networks are available, receiver/transceiver **1108** is configured to receive RF signals, for example as generated by nearby remote control device **1180**. Remote control device **1180** is similar to a garage door opener, for example, and includes a deploy button **1182**, that upon activation, transmits an RF

signal to receiver/transceiver **1108**. Remote **1180** allows a homeowner to deploy flood shield **100** by pressing deploy button **1182** while remote **1180** is in range of flood shield **100**. Remote **1180** may be configured (e.g., paired) to control one or more specific flood shields **100**. For example, one remote control device **1180** may be paired with multiple flood shields **100** such that all are deployed simultaneously upon activation of deploy button **1182**.

Upon receiving a "deploy" command via receiver/transceiver **1108**, processor **1102** executes software **1110** to control motor driver **1106** to drive motor **120** to deploy flood shield **100**.

Controller **1100** may also receive a status request, via receiver/transceiver **1108**, and respond by sending, via receiver/transceiver **1108**, information of status **1112** in reply. That is, mobile device **1190** may request a status from controller **1100**, receiving and displaying status **1194** in response. Thus, the user of mobile device **1190** may view a current status of flood shield **100** and remotely deploy flood shield **100**.

A server **1150** may communicate with controller **1100** to receive status **1112** and to automatically deploy flood shield **100**. Server **1150** may be run by a service company that monitors status **1112** of flood shield **100** and deploys flood shield **100** when needed, for example as determined from emergency information relevant to the installed location of flood shield **100**. By monitoring status **1112** of flood shield **100**, servicing of flood shield **100** may be scheduled as needed. In one operational example, server **1150** monitors a plurality of flood shields **100** that are deployed on buildings within an area susceptible to flooding. When server **1150** learns (e.g., from a government agency) of possible flooding in that area, server **1150** sends "deploy" commands to the plurality of flood shields **100** and verifies successful deployment through monitoring of status **1112**.

In one embodiment, controller **1100** periodically sends status information to one or both of server **1150** and mobile device **1190**.

Once deployed, flood shield **100** is able to hold the pressure and force of a flood as well as the force of blunt objects and debris that could be hurdled at it. The design ensures that water cannot seep past the edges. When properly installed, flood shield **100** prevents water and debris from entering a basement via the windows/doorways/openings it is protecting.

FIG. **12** is a flowchart illustrating one exemplary method **1200** for deploying flood shield **100** of FIG. **1** to protect opening **153** from ingress of water. Method **1200** is for example implemented within software **1110** of controller **1100**, FIG. **11**, to deploy flexible shield **106** of flood shield **100**.

In step **1202**, method **1200** waits to receive a deploy command. In one example of step **1202**, software **1110** monitors input from receiver/transceiver **1108** to wait for a deploy command to be received from any of remote **1180**, mobile device **1190**, and server **1150**. Step **1204** is optional. If included, in step **1204**, method **1200** authenticates the deploy command received in step **1202**. In one example of step **1204**, software **1110** identifies an authentication feature of deploy command **1109** as authentication of the source of deploy command **1109**.

Step **1206** is an optional decision. If, in step **1206**, method **1200** determines that the deploy command is authentic, method **1200** continues with step **1208**; otherwise method **1200** continues with step **1202**.

In step **1208**, method **1200** activates the deployment motor. In one example of step **1208**, software **1110** controls motor driver **1106** to drive motor **120**, which winds cables **802** onto winding area **903** and pulls shield **106** from roller **702** until top **107** reaches top channel **108** after a predefined period.

In step **1210**, method **1200** deactivates the deployment motor. In one example of step **1210**, software **1110** controls motor driver **1106** to switch off power to motor **120** after the predefined period.

Changes may be made in the above methods and systems without departing from the scope hereof. It should thus be noted that the matter contained in the above description or shown in the accompanying drawings should be interpreted as illustrative and not in a limiting sense. The following claims are intended to cover all generic and specific features described herein, as well as all statements of the scope of the present method and system, which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A deployable flood shield for preventing ingress of water through an opening in a wall of a building, comprising:

an outer frame positioned to surround the opening and comprising a top channel, a bottom channel, a left channel and a right channel wherein the frame attaches to the wall and forms a water-tight seal between the frame and the wall;

a flexible shield stored within the top or bottom channel prior to deployment, the flexible shield having a left edge retained by the left channel and a right edge retained by the right channel;

seals configured with each of the bottom, left, and right channels for sealing between the bottom, left, and right channels and the flexible shield when deployed; and

a controller for deploying the flexible shield to prevent the ingress of water into the opening.

2. The deployable flood shield of claim **1**, wherein each of the left and right edges comprises a spring strip.

3. The deployable flood shield of claim **1**, further comprising:

a rod laterally positioned within the top channel;

a left cable attached to (a) the left edge of the flexible shield and (b) the rod;

a right cable attached to (c) the right edge of the flexible shield and (d) the rod;

a motor for rotating the rod to simultaneously wind-up the left and right cables to deploy the flexible shield.

4. The deployable flood shield of claim **3**, further comprising a ratchet mechanism mechanically coupled with the rod to prevent the left and right cables from unwinding.

5. The deployable flood shield of claim **3**, further comprising gearing between the motor and the rod, wherein the gearing prevents the left and right cables from unwinding.

6. The deployable flood shield of claim **1**, further comprising a roller laterally positioned within the bottom channel for storing the flexible shield, wherein a bottom edge of the flexible shield is permanently attached to the roller such that the bottom edge of the flexible shield is permanently retained within the bottom channel.

7. The deployable flood shield of claim **6**, further comprising a release mechanism for allowing the flexible shield to be retracted.

8. The deployable flood shield of claim **7**, further comprising a retracting mechanism for retracting the flexible shield into the bottom channel when released by the release mechanism.

9. The deployable flood shield of claim **8**, the retracting mechanism comprising a spring that is wound up when the flexible shield is deployed.

10. The deployable flood shield of claim 1, further comprising a wireless receiver for receiving a deploy command within the controller from a radio transmitter, wherein the deploy command comprises an emergency broadcast signal from the radio transmitter.

11. The deployable flood shield of claim 1, further comprising at least one sensor coupled with the controller and positioned to detect environmental conditions proximate the deployable flood shield.

12. The deployable flood shield of claim 1, further comprising a transceiver for wirelessly communicating with a cellular network to receive a deploy command within the controller from a mobile device, the deploy command instructing the controller to automatically deploy the flexible shield to prevent the ingress of water into the opening.

13. The deployable flood shield of claim 12, further comprising one or more sensors coupled with the controller for sensing a status of the deployable flood shield.

14. The deployable flood shield of claim 13, the one or more sensors sensing a voltage of a battery configured with the deployable flood shield to provide power to the controller and a motor that is controlled by the controller to deploy the flexible shield.

15. The deployable flood shield of claim 13, the controller configured to send a current status of the deployable flood shield to a remote device via the wireless local area network.

16. The deployable flood shield of claim 1, further comprising a transceiver for wirelessly communicating with a wireless local area network to receive a deploy command within the controller, the deploy command instructing the controller to automatically deploy the flexible shield to prevent the ingress of water into the opening.

17. The deployable flood shield of claim 16, further comprising one or more sensors coupled with the controller for sensing a status of the deployable flood shield.

18. The deployable flood shield of claim 17, the one or more sensors sensing a voltage of a battery configured with the deployable flood shield to provide power to the controller and a motor that is controlled by the controller to deploy the flexible shield.

19. The deployable flood shield of claim 17, the controller configured to send a current status of the deployable flood shield to a remote device via the wireless local area network.

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